

The Impact of the State Children’s Health Insurance Program’s Unborn Child Ruling Expansions on Foreign-Born Latina Prenatal Care and Birth Outcomes, 2000–2007

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Abstract The 2002 “unborn child ruling” resulted in State Children’s Health Insurance Program (SCHIP) expansion for states to cover prenatal care for low-income women without health insurance. Foreign-born Latinas who do not qualify for Medicaid coverage theoretically should have benefited most from the policy ruling given their documented low rates of prenatal care utilization. This study compares prenatal care utilization and subsequent birth outcomes among foreign-born Latinas in six states that used the unborn child ruling to expand coverage to those in ten states that did not implement the expansion. This policy analysis examines cross-sectional pooled US natality data from the pre-enactment years (2000–2003) versus post-enactment years (2004–2007) to estimate the effect of the UCR on prenatal care utilization and birth outcome measures for foreign-born Latinas. Then using a

difference-in-difference estimator, we assessed these differences across time for states that did or did not enact the unborn child ruling. Analyses were then replicated on a high-risk subset of the population (single foreign-born Latinas with lower levels of education). The SCHIP unborn child ruling policy expansion increased PNCU over time in the six enacting states. Foreign-born Latinas in expansion enacting states experienced increases in prenatal care utilization though only the high-risk subset were statistically significant. Birth outcomes did not change. The SCHIP unborn child ruling policy was associated with enhanced PNC for a subset of high-risk foreign-born Latinas.

Keywords Prenatal care · Foreign-born Latina · Differences-in-differences · Unborn child ruling · Immigrant health · Birth outcomes

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Abbreviations

PRWORA	Personal Responsibility and Work Opportunity Act
NCHS	National Center for Health Statistics
DD	Difference-in-differences
SCHIP	State Children’s Health Insurance Program
APNCU	Adequacy of Prenatal Care Utilization
ARS	Adequacy of Received Services
NAPHSIS	National Association for Public Health Statistics Information Systems

Introduction

Prenatal care represents a major means for promoting maternal and infant health and providing primary care services for women during pregnancy. In spite of the century-old belief that prenatal care reduces risks

associated with low birth weight (LBW) and preterm birth, uncertainty remains as to the direct effect of prenatal care services on birth outcomes [1, 2]. This uncertainty is in part, due to limitations in research methods, unclear operational definitions, gestational age bias, selection bias, and lack of comparable gestational age between study populations [2–4]. Women who receive these services generally have better health outcomes [1]. Nonetheless, while there is some debate about the value and timing of clinical services during pregnancy for birth outcomes, the medical community generally agrees that such services should be available to all women [1].

Prenatal care is still far from universal among many disadvantaged groups, including foreign-born Latinas [5–9]. Many women in this population are unauthorized non-citizens or non-citizen residents and therefore are ineligible for many publicly funded programs that typically cover low-income women for prenatal care services, resulting in lower rates of prenatal care utilization and initiation [10–13]. It has been long noted that Latinas are significantly less likely to initiate prenatal care early, and three times as likely to obtain late or no care [5]. From 2000 to 2002, the fifteen states with the largest number of foreign-born Latinas had significantly lower rates of adequate prenatal care utilization (65 %) compared to US-born women (74 %) in the same state [10]. Similarly, in 2005, 77.5 % of all Latinas delivering in the US initiated prenatal care in the first trimester, compared with 89 % of non-Hispanic whites [12].

The Hispanic Paradox as it relates to birth outcomes is based on the notion that foreign-born Latinas, particularly from Mexico and Central America, have as good or better outcomes than US-born Latinas or non-Latina populations [14–16]. This phenomenon may be specific to certain regions of the US and changing with time as some states report higher rates of foreign-born Latina preterm births and LBW infants than non-Hispanic White mothers [17, 18] Existing research indicates a clear benefit from receipt of timely and adequate care to improve or maintain the health of foreign-born Latinas and their children [12, 14, 16]. Insuring adequate prenatal care remains important for this population in spite of historically positive outcomes.

In response to low utilization of prenatal care among unauthorized mothers, primarily due to their ineligibility to publicly funded programs, lawsuits were passed that resulted in a series of court rulings. The first recorded case related to prenatal care and unauthorized residents was a class action suit (Lewis v. Grinker) in 1991 against the Eastern District of New York for denying Medicaid-sponsored prenatal care to unauthorized Latinas. The court held that the unborn fetuses of unauthorized mothers as future US citizens are entitled to prenatal care, which resulted in mothers having improved access to care in the

state of New York [5]. This case received widespread attention in reproductive rights circles.

Despite this positive ruling, the eligibility of Latinas for publicly funded prenatal care services was diminished on a national scale with the passing of the 1996 Personal Responsibility and Work Opportunity Act (PRWORA). Prior to PRWORA states allowed unauthorized immigrants access to prenatal care covered through Medicaid. After PRWORA unauthorized immigrants (the majority being Latinas) could no longer receive a wide variety of social and health services (including prenatal care) through Medicaid, and legal permanent residents were required to prove 5 years of residence [19]. In spite of these limitations states developed creative ways to continue providing prenatal care services to this population (e.g. Title V, farmworker health funds, presumptive eligibility, health foundations, etc.).

In order to fill the gap in coverage for these women created by PRWORA, the SCHIP Eligibility for Prenatal Care and Other Health Services for Unborn Children final policy ruling was issued in 2002 under the GW Bush Administration [20]. The “Unborn Child Ruling” (henceforth referred to as the expansion) as it came to be known, provided states with additional matching federal dollars through SCHIP aimed at enhancing prenatal care services for women otherwise ineligible for Medicaid. States had the option of expanding their SCHIP programs to use these funds, but were not mandated to do so. The expansion was perceived as potentially having far-reaching implications for improving utilization and adequacy of prenatal care, and possibly improvements in birth outcomes, among all unauthorized immigrants, especially foreign-born Latinas, given that they represented the majority of this population [21–23]. However, to date, little or no research exists to examine the impact of these expansions as a result of the ruling. The purpose of this policy analysis is to provide an initial estimation of the impact that the expansion had on prenatal care utilization and birth outcomes for foreign-born Latinas, particularly a high-risk subset of this population.

Methods

The study design was a quasi-experimental retrospective observational cohort design using 2000–2007 National Center for Health Statistics (NCHS) live birth files [24] from sixteen states. A number of the key variables were not publicly available in the NCHS birth files across each of the 8 years of this analysis. For these years data was solicited through the National Association for Public Health Statistics Information Systems (NAPHSIS). The 2004 Kaiser report was an additional data source used to

create a variable controlling for states that already provided state-funded prenatal care to this population [21].

We selected live births to foreign-born Latinas (Mexican and Central/South American) from sixteen states. Only Mexican and Central/South American mothers were included as they represented a more recent immigrant population and countries with the largest proportion of unauthorized foreign-born Latinas [25]. As birth certificate files do not include unauthorized status, foreign-born and country of birth were used to select subjects. This study was approved by the University of Alabama at Birmingham Institutional Review Board in April 2011 as non-human subjects research (IRB # N110301006).

The sixteen states included the six states that enacted the expansion prior to 2004 (enacting-AR, IL, MA, MI, MN, RI) and ten states as controls that enacted post 2007 (non-enacting-CT, IN, LA, MO, NE, OK, OR, TN, VA, WI) [26–28]. Of the enacting states, five enacted the UCR in late 2003 and one in early 2004. Of the ten non-enacting control states, six were selected because of geographic proximity to enacting states (OK, MO, VA, IN, WI, CT). An additional four states were selected because they enacted the expansion at the end of 2007 or later [26–28]—thus, arguably, sharing some similar political values regarding foreign-born Latinas as the enacting states. As a result the ten control states shared similarities to the enacting states in terms of geography and/or eventual enactment of this expansion after 2007.

The NCHS files contained information on 664,783 foreign-born Latina mothers from the sixteen states with births in 2000–2007. After the exclusion of 12 % of the mothers ($n = 80,866$) due to missing variables across data fields, the final number of births in enacting and non-enacting states from 2000 to 2007 was 583,917.

A further sub-analysis was conducted on Mexican-born single mothers with <8 years of education ($n = 70,809$) in order to further assess the impact of this expansion, on a high-risk subset that would have benefited most from the ruling, considering their large proportion that were unauthorized in these states during the study period [29]. The three characteristics to identify this subset—education, single-mother status and Mexican-born (in many of the states over 75 % of the Mexican population were unauthorized)—place these mothers at higher-risk for low utilization of prenatal care and poor birth outcomes [12, 29, 30].

We applied linear probability multivariate regression models and a ‘difference-in-differences’ (DD) approach [31] to examine the association between the unborn child ruling expansion and prenatal care utilization and birth outcomes. The DD is an econometric technique appropriate for analyzing the effects of a policy in a quasi-experimental situation, where we have ‘before and after’ data from

enacting states, and corresponding data from non-enacting (control states) [31]. This “differencing” estimates the effect of the expansion and effectively controls for all other characteristics that are constant over time. In this policy analysis the DD is employed to control for unobservable and potentially confounding variables between enacting and non-enacting states, as well as individual confounders that could not be controlled for between foreign-born Latinas across states. The estimates produced therefore diminish variable bias that cannot be accounted for in the regression model by employing state effects that are constant over time and time effects that are the same across states.

Thus this model is sometimes referred to as the ‘two-way fixed effects’ model. The equation is given below:

$$Y_{i,s,t} = \beta_0 + \beta_1 S_s + \beta_2 T_t + \beta_3 (S \cdot T) + X_{i,s,t}^a a^a + X_s^b 1^b + U$$

$Y_{i,s,t}$ is the outcome measured for the i th woman in the s th state in the t th time period. S represents a binary indicator for enacting (equal 1) versus control state. T is a binary indicator of post-enactment time period (equal 1) versus prior to enactment time period (equal 0). The interaction between S and T essentially creates a binary indicator equal 1 when the policy is actually in effect, and 0 for all else. In this model, coefficient β_1 captures baseline differences in outcomes for women in enacting versus control states. The coefficient β_2 captures the changes in the outcome over time, even in absence of the expansion. The coefficient β_3 , captures the actual association of the policy of interest (here, the expansion being in effect) and outcome of interest (prenatal care utilization and birth outcomes). We also controlled for a vector of maternal characteristics (X_i^a), and of time varying state level characteristics (X_s^b) that were potentially correlated with enactment of the expansion as well as the outcomes of interest. Our outcomes of interest are binary; hence the regressions were estimated using linear probability models.

The primary outcome measure of prenatal care utilization was the Adequacy of Prenatal Care Utilization (AP-NCU) index [32] which equaled 1 if >79 % of expected visits reported. This measure combines two indices measuring month of prenatal care initiation and Adequacy of Received Services (ARS). The ARS measures the appropriate number of PNC visits for the time period that PNC services were received and equaled 1 if reported PNC initiation by the 4th month of pregnancy and >79 % of expected visits reported. We also measured PNC initiation where scores equaled a 1 if reported in the first trimester.

Birth outcomes included were low LBW, birth weight <2,500 g; preterm birth, delivery <37 weeks’ gestation; small for gestational age (SGA), birth weight below the 10th percentile for gestational age; and large-for-gestational age

(LGA), birth weight above the 90th percentile for gestational age.

Individual control variables for foreign-born Latina mothers available from NCHS files included marital status (yes/no), maternal country of birth (foreign-born), parity (continuous variable), plurality (singleton vs. multiple), chronic hypertension (yes/no), prenatal hypertension (yes/no), tobacco use (yes/no), and diabetes (yes/no). Twelve of the states included in this study maintained use of the 1989 version of the birth certificate throughout the study period and four states used the 2003 revision of the birth certificate during part of the study. Recoding of variables across years was required to address any coding differences between the two revisions. Specifically maternal age (continuous), education, and entry into prenatal care, were not fully compatible and required re-categorization into larger crude groups. Maternal education, for example, was categorized into <8 years, 9–12 years, and >12 years of education. A number of critical variables to this study (including state of residence, nativity of mother) were not available in the NCHS public files from 2005 to 2007, but were obtained through a request from the NAPHSIS.

In addition a state-level dummy variable was included on whether in 2004 states reported a broad mechanism to finance the provision of prenatal care services to foreign-born Latinas. This variable was based upon a Kaiser Foundation report and controlled for states providing some form of statewide coverage to otherwise ineligible foreign-born Latinas prior to 2004 [21]. Most of the enacting states and almost half of non-enacting states provided some form of state-based PNC to immigrants prior to the passage of the expansion by all enacting states. State-funded prenatal care programs were controlled for as a potential study design confounder even though they did not go into effect simultaneously with the expansion. Provided that enacting and non-enacting states did not have major differences in their prior mechanism for the provision of prenatal care to this population (aside from the unborn child related expansion) the DD methodology controls for potential unobservable confounders.

Results

During the baseline or pre enactment period (2000–2003), there were some demographic differences between foreign-born Latinas in enacting versus non-enacting states (Table 1). In enacting states there were more births (168 vs. 131 K) during this four-year period. Other notable differences in the pre study period were a larger percentage of Mexican births and slightly higher education levels in enacting states. Otherwise demographic and birth characteristics in enacting and non-enacting states were very similar.

In the post enactment period (2004–2007), the number of foreign-born Latina births was similar in enacting and non-enacting states (Table 1). There were increases in foreign-born Latina births overall during the post period, but births increased significantly more in non-enacting states ($n = 51,772$) versus enacting ($n = 16,149$). Maternal education improved between periods for both groups but remained slightly lower in non-enacting states. The number of mothers with <8 years of education and number of married mothers decreased significantly in all states.

Table 2 presents the unadjusted differences for prenatal care measures across time and states among foreign-born Latinas. The general trend over time was an improvement in measures of prenatal care in enacting states and a worsening in non-enacting states. In enacting states all indices measuring prenatal care utilization (early prenatal care 4.3 %, ARS 1.5 %, APNCU 4.7 %) were significantly improved ($p < 0.01$) across the eight-year period. In non-enacting states, early prenatal care and APNCU declined significantly. The differences in these outcomes were significant between enacting and non-enacting states.

Table 3 presents the proportion of adverse birth outcomes, comparing time periods and policy enactment. Foreign-born Latina birth outcomes were virtually identical in terms of percentage of LBW, preterm, and gestational age and temporal changes were similar. Except for LGA, outcomes worsened for both groups of states, but enacting states were no different statistically from non-enacting states in this decline.

Table 4 presents adjusted estimates (including all fixed effects, individual covariates, and state-level covariate) from the previous DD fixed-effects equation, with the total foreign-born Latina birth mother population (Model 1) and then a subset of high-risk Latinas (Model 2). In model 1 the population included 583,917 total births. Early prenatal care was significantly better in the enacting states prior to the expansion and increased significantly over the time period. The DD estimator for APNCU was not statistically significant ($p = 0.12$) indicative that enacting states had higher baseline scores and that changes over time were potentially due to other factors beyond the expansion.

In Model 2 the sample included 70,809 high-risk foreign-born Latinas. After adjusting for the state and individual maternal covariates, early prenatal care was significantly better at baseline for enacting states compared to non-enacting. Early prenatal care also improved significantly over time. The adjusted regression results produced a significant APNCU DD estimator (0.044, $p < 0.05$) indicating that when controlling for all other observed and unobserved (through fixed effects) the enactment of the expansion increased prenatal care utilization in this high-risk group of foreign-born Latinas.

Table 1 Time trend and comparison state differences in Latina demographic and maternal risk factors

	Enacting ^b			Non-enacting ^c			Between group difference
	Pre 2000–2003	Post 2004–2007 ^a	<i>p</i> value	Pre 2000–2003	Post 2004–2007	<i>p</i> value	
Total births	167,842	183,991***	<0.01	130,589	182,361***	<0.01	35,623***
Mothers age	26.56 (5.8)	27.06 (5.9)***	<0.01	26.16 (5.8)	26.70 (5.9)***	<0.01	0.54
Education							
8 yrs or less	55,836 (34.0)	55,340 (30.9)***	<0.01	47,262 (37.1)	51,277 (34.2)***	<0.01	0.2 %***
9–12 yrs	85,482 (52.0)	98,125 (54.8)***		62,429 (49.0)	76,998 (51.3)***		0.5 %***
>12 yrs	13,981 (14.0)	25,594 (14.3)***		17,656 (13.9)	21,810 (14.5)***		0.3 %***
Marital status							
Married	98,203 (58.5)	96,450 (52.4)***	<0.01	75,500 (57.8)	93,007 (51.0)***	<0.01	0.7 %
Single	69,639 (41.5)	87,541 (47.6)		55,089 (42.2)	89,354 (49.0)		0.7 %
Place of birth							
Mexican	136,850 (81.5)	147,178 (80.0)***	<0.01	93,564 (71.7)	126,657 (69.5)***	<0.01	0.7 %***
Central/SA ^d	30,992 (18.5)	46,813 (20.0)***		37,025 (28.4)	55,704 (30.6)***		0.7 %***
Parity	2.44 (1.5)	2.51 (1.52)***	<0.01	2.38 (1.5)	2.48 (1.5)***	<0.01	0.02 %***
Plurality							
Singleton	164,620 (98.1)	180,360 (98.0)	0.25	128,210 (98.2)	178,919 (98.1)***	0.2	0.0 %
Multiple ^e	3,222 (1.9)	3,631 (2.0)		2,379 (1.8)	3,442 (1.9)		0.0 %

*, **, *** Significantly different from zero at the .10, .05, .01 level, respectively (X^2 or *t* test)

^a The time periods used are as follows: Pre policy enactment, 2000–2003; Post policy enactment, 2004–2007

^b The policy enacting (treatment) states are as follows: AR, IL, MA, MI, MN, & RI

^c States that did not enact the SCHIP unborn child policy between 2000 and 2003

^d Births from Central and South American mothers

^e Multiple birth deliveries

Table 2 Unadjusted estimate of prenatal care utilization with time and state fixed effects

	Enacting			Non-enacting			Between group difference
	Pre 2000–2003	Post 2004–2007	<i>p</i> value	Pre 2000–2003	Post 2004–2007	<i>p</i> value	
Early PNC ^a							
1 = yes	121,046 (72.1)	136,450 (74.2)	$X^2 = 187$	83,839 (64.2)	112,932 (61.9)	$X^2 = 168$	4.31 %***
2 = no	46,796 (27.9)	47,541 (25.8)	$p < 0.01$	46,750 (35.8)	69,429 (38.1)	$p < 0.01$	
ARS (%) ^a							
1 = adequate	123,540 (77.3)	135,201 (79.9)	$X^2 = 141$	92,996 (73.9)	129,949 (74.1)	$X^2 = 1$	1.54 %***
2 = inadequate	36,314 (22.7)	35,959 (21.0)	$p < 0.01$	32,886 (26.1)	45,547 (26.0)	$p < 0.3$	
APNCU (%) ^a							
1 = adequate	106,934 (66.9)	120,602 (70.5)	$X^2 = 489$	75,602 (60.1)	103,359 (58.9)	$X^2 = 41$	4.73 %***
2 = inadequate	52,920 (33.1)	50,558 (29.5)	$p < 0.01$	50,280 (39.9)	72,137 (41.1)	$p < 0.01$	

*, **, *** Significantly different from zero at the .10, .05, .01 level between enacting and non-enacting states

^a Early PNC = prenatal care in 1st trimester, ARS = measure of appropriate number of PNC visits considering period of attention, APNCU = index combining early PNC and ARC

Discussion

This study provides definitive evidence that prenatal care utilization increased significantly more in enacting states during this 8 year study period. It provides further

evidence that the policy expansion of public insurance eligibility that resulted from the unborn child ruling had a moderate impact on increasing early entry into prenatal care among a high-risk group of foreign-born Latinas. Significant associations were found despite the relatively

Table 3 Unadjusted estimate of birth outcomes with time and state fixed effects

	Enacting			Non-enacting			Between group difference (%)
	Pre 2000–2003	Post 2004–2007	<i>p</i> value	Pre 2000–2003	Post 2004–2007	<i>p</i> value	
LBW (%)^a							
1 = yes	9,603 (5.7)	11,194 (6.1)	$X^2 = 21$	7,374 (5.7)	10,740 (5.9)	$X^2 = 8$	−0.11
2 = no	158,120 (94.3)	172,709 (93.9)	$p < 0.01$	123,077 (94.4)	171,435 (94.1)	$p < 0.01$	
Pterm (%)^a							
1 = yes	26,832 (16.6)	30,959 (17.4)	$X^2 = 42$	20,826 (16.6)	31,155 (17.7)	$X^2 = 66$	0.29
2 = no	135,273 (83.5)	147,094 (82.6)	$p < 0.01$	104,932 (83.4)	144,963 (82.3)	$p < 0.01$	
SGA (%)^a							
1 = yes	14,522 (8.8)	16,122 (8.9)	$X^2 = 0.83$	11,280 (8.8)	15,999 (8.9)	$X^2 = 1$	0.00
2 = no	150,559 (91.2)	165,334 (91.1)	$p < 0.36$	116,742 (91.2)	163,331 (91.1)	$p < 0.30$	
LGA (%)^a							
1 = yes	17,069 (10.3)	17,395 (9.6)	$X^2 = 50$	13,442 (10.50)	17,467 (9.7)	$X^2 = 48$	0.01
2 = no	148,072 (89.7)	164,061 (90.4)	$p < 0.01$	114,580 (89.50)	161,863 (90.3)	$p < 0.01$	

Weight >90th percentile for gestational age

*, **, *** Significantly different from zero at the .10, .05, .01 level between enacting and non-enacting states

^a LBW = <2,500 g, preterm birth = <37 weeks gestation, SGA = birth weight <10th percentile for gestational age, LGA = birth

Table 4 Adjusted estimate of latina prenatal care utilization using time and state fixed effects

PNC utilization variables	Model (1) DD ^a in enacting versus non-enacting states	Model (2) DD high-risk Latinas in enacting versus non-enacting states
Early PNC		
Treatment	0.044** (0.019)	0.060** (0.024)
Time	0.022* (0.013)	0.044** (0.019)
Treatment × time	0.008 (0.015)	0.010 (0.020)
ARS index		
Treatment	0.001 (0.028)	0.026 (0.033)
Time	−0.002 (0.014)	0.017 (0.017)
Treatment × time	0.020 (0.017)	0.016 (0.018)
APNCU index		
Treatment	0.020 (0.032)	0.037 (0.034)
Time	0.005 (0.015)	0.028 (0.018)
Treatment × time	0.032 (0.021)	0.044** (0.02)
Sample size	583,917	70,809

The regression models control for demographic and maternal characteristics. The sample sizes reported are the number of observations with complete data for all covariates in the regression models. Actual sample sizes vary somewhat across models due to variation in response rates

*, **, *** Significantly different from zero at the .10, .05, .01 level

^a The time periods used are as follows: Pre expansion, 2000–2003; Post expansion, 2004–2007

short post-enactment period. There were no significant differences in birth outcomes between expansion enacting and non-enacting states across populations and periods.

This is the first known study to estimate the association of the unborn child ruling expansion on prenatal care utilization and birth outcomes. Although different measures and study timeframes were applied, associations between expansions in foreign-born eligibility and subsequent increases in APNCU scores were consistent with existing research [6, 19, 33–38]. These findings indicate that prenatal care utilization varies with changes in health coverage policies while providing initial evidence that this expansion increased prenatal care accessibility resulting in increases in utilization among high-risk foreign-born Latinas.

We did not find any significant differences over the time period and between states for birth outcome measures. The lack of association between increases in prenatal care and improvements in birth outcomes is not unusual, as other studies note the complexities in establishing a direct relationship between these two variables [2–4, 39–42]. However, prenatal care access and utilization are critical to more than just birth outcomes in improving overall health, especially in immigrant populations. Furthermore, life course critiques of prenatal care suggest that services during pregnancy are important but part of many other life-long social, environmental and genetic determinants on birth outcomes. This study found no direct relationship between state improvements in prenatal care utilization supporting this view.

This policy analysis has certain limitations: one being potential measurement error from use of national vital statistics data. These may be categorized into the inaccuracies in the birth certificate birth outcomes [24] and PNC data [32, 43] as well as the combining of old and revised

birth certificate data to analyze trends in prenatal care. As noted previously, specific individual variables were re-categorized and may present measurement bias, but the differences and biases should be stable over time [32]. Although the difference-in-differences method controls for individual and state level characteristics, it is possible that unmeasured variables confounded outcome measures. The inability to determine the specific percentage of eligible and ineligible women that enrolled in prenatal care as a direct result of this expansion may hinder interpretation of the findings. A potential area of future research to determine the precise impact of program expansions on foreign-born Latinas is the use of birth certificate linked payer information to establish means of eligibility, and use of other data sources to estimate number of unauthorized at the state level.

These findings indicate that states enacting the expansion had improved prenatal care utilization at baseline for foreign-born Latinas when compared to non-enacting states. Many of the enacting and a large portion of non-enacting states were previously providing prenatal care services to this population. The enacting states likely used the expansion as a means to increase matching funds for these associated costs. Regardless, our findings provide initial evidence of a benefit from the expansion of prenatal care coverage to high-risk foreign-born Latinas. The unborn child ruling expansion may be one potential mechanism to increase prenatal care utilization for foreign-born Latinas among a number of potential policy choices.

When the expansion was passed in 2002, there were several critiques among women's health advocates, related primarily to the political underpinnings and implications of the decision. There was concern that the expansion shifted the focus of prenatal care from mothers to fetuses, that it could potentially undermine legal abortion rights, and could substitute for better and more direct ways to provide prenatal care to otherwise uninsured women [44–47]. The unborn child ruling expansion is only one of many approaches to potentially improve the prenatal care utilization of high-risk foreign-born Latinas. However, future efforts should go beyond simply creating a mechanism for prenatal care eligibility but include accompanying community outreach and enrollment strategies.

Previous research suggests that policies that exclude foreign-born Latinas from government sponsored prenatal care programs do not deter immigration but are likely to heighten the number of mothers and children at risk of poor health and birth outcomes [48]. The past two decades have seen unprecedented levels of foreign-born Latina births, especially in non-traditional migrant states [29, 49, 50]. As the estimated proportion of unauthorized foreign-born Latinas has risen [51], attention to the well-being of their children will have a significant impact on public health.

This policy analysis may further assist state decision-makers in the planning of programs to improve timely and adequate prenatal care for high-risk foreign-born Latinas. These findings suggest that states that facilitate access and utilization for foreign-born Latinas through mechanisms such as the unborn child expansion, increase prenatal care utilization.

References

- McCormick, M. C., & Siegel, J. C. (1999). *Prenatal care: Effectiveness and implementation*. Cambridge: Cambridge Press.
- Alexander, G. R., & Kotelchuck, M. (2001). Assessing the role and effectiveness of prenatal care: History, challenges, and directions for future research. *Public Health Reports*, 116, 306–316.
- Alexander, G. R., & Korenbrot, C. C. (1995). The role of prenatal care in preventing low birth weight. *Future of Children*, 5(1), 103–120.
- Fiscella, K. (1995). Does prenatal care improve birth outcomes? A critical review. *Obstetrics and Gynecology*, 85(3), 468–479.
- Health and Human Services. (1998). Routine prenatal and postpartum care for undocumented aliens. <https://oig.hhs.gov/oei/reports/oei-07-96-00310.pdf>. Accessed 11 Oct 2013.
- Fuentes-Afflick, E., Hessel, N. A., Bauer, T., et al. (2006). Use of prenatal care by Hispanic women after welfare reform. *Obstetrics and Gynecology*, 107, 151–160.
- Hayes-Bautista, D. E., Gamboa, C., Kahramanian, M. I., Hayes-Bautista, M., & Hsu, P. (2012). *Timely access to prenatal care: Prime necessity for Latina mothers. Policy brief*. Los Angeles: Center for the Study of Latino Health and Culture.
- Kalofonos, I., & Palinkas, L. A. (1999). Barriers to prenatal care for Mexican and Mexican American women. *Journal of Gender, Culture, and Health*, 4, 135–152.
- Wasserman, M., Bender, D., & Lee, S. D. (2007). Use of preventive maternal and child health services by Latina women: A review of published intervention studies. *Medical Care Research and Review*, 64, 4–45.
- Acevedo-Garcia, D., & Cacari, S. L. (2008). State variation in health insurance coverage for US citizen children of immigrants. *Health Affairs*, 27(2), 434–446.
- Glasford, A., & Huang, P. (2008). Immigrant women's health a casualty in the immigration policy war. *Women's Health Activist*, 1–3.
- Luecken, L. J., Purdom, C., & Howe, R. (2009). Prenatal care initiation in low-income Hispanic women: Risk and protective factors. *American Journal of Health Behavior*, 33, 264–275.
- Devine, S. (2010). Rethinking the Hispanic Paradox: Favorable low birth weight outcomes obscure a hidden epidemic of Large-For-Gestational-Age births, in 2010. *American Public Health Association Conference*. Denver, CO.
- Kelاهر, M., & Jessop, D. J. (2002). Differences in low-birth-weight among documented and undocumented foreign-born and US-born Latinas. *Social Science and Medicine*, 55, 2171–2175.
- McDonald, J. A., Suellentrop, K., Paulozzi, L. J., & Morrow, B. (2008). Reproductive health of the rapidly growing Hispanic population: Data from the pregnancy risk assessment monitoring system. *Maternal and Child Health Journal*, 2008(12), 342–356.
- McGlade, M. S., Saha, S., & Dahlstrom, M. E. (2004). The Latina paradox: An opportunity for restructuring prenatal care delivery. *American Journal of Public Health*, 94, 2062–2065.
- Shiono, P. H., & Klebanoff, M. A. (1986). Ethnic differences in preterm and very preterm delivery. *American Journal of Public Health*, 76(11), 1317–1321.

18. James, C. V., Salganicoff, A., Thomas, M., & Lillie-Blanton, M. (2009). Putting women's health care disparities on the map. Henry J. Kaiser Foundation Report.
19. Park, L. S., Sarnoff, R., Bender, C., & Korenbrot, C. (2000). Impact of recent welfare and immigration reforms on use of Medicaid for prenatal care by immigrants in California. *Journal of Immigrant Health*, 2(1), 5–22.
20. McCullough, L. B., & Chervenak, F. A. (2008). A critical analysis of the concept and discourse of 'unborn child'. *American Journal of Bioethics*, 8(7), 34–39.
21. Kaiser Commission on Medicaid and the Uninsured. (2004). Covering new americans: A review of federal and state policies related to immigrant's eligibility and access to publicly funded health insurance. Center on Budget and Policy Priorities.
22. National Immigration Law Center. (2003). Prenatal coverage for immigrants through SCHIP. <http://www.nilc.org/>. Accessed 12 Jan 2014.
23. National Health Policy Forum. (2003). Sailing SCHIP through troubled waters, Washington D.C.
24. Centers for Disease Control and Prevention. (2011). Vital statistics birth data files. National Center for Health Statistics.
25. Migration Policy Institute. (2010). Mexican foreign-born residing in the United States. <http://www.migrationpolicy.org/article/mexican-immigrants-united-states-0> Accessed 15 Oct 2013.
26. US Department of Health and Human Services. (2012). Overview of immigrant eligibility for SNAP, TANF, Medicaid, and CHIP. <http://aspe.hhs.gov/hsp/11/ImmigrantAccess/Eligibility/ib.shtml> Accessed 30 Jul 2014.
27. Medicaid. (2014). CHIP state program information. <http://www.medicicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Childrens-Health-Insurance-Program-CHIP/CHIP-State-Program-Information.html> Accessed 30 Jul 2014.
28. Baumrucker, E. P. (2008). Congressional Research Service Report for Congress: SCHIP coverage for pregnant women and unborn children.
29. Brick, K., Challinor A. E., & Rosenblum M. R. (2011). Mexican and Central American immigrants in the United States. Report from Migration Policy Institute.
30. Albrecht, S. L., & Miller, M. K. (1996). Hispanic subgroup differences in prenatal care. *Social Biology*, 43(1–2), 38–57.
31. Wooldridge, J. (2001). Chapter 13 Pooling cross sections across time: Simple panel data methods in Introductory econometrics: A modern approach. Mason, Ohio.
32. Kotelchuck, M. (1994). An evaluation of the Kessner adequacy of prenatal care index and a proposed adequacy of prenatal care utilization index. *American Journal of Public Health*, 84(9), 1414–1420.
33. Bengiamin, M., Capitman, J. A., & Mathilda, R. (2007). *Prenatal care and birth outcomes: Challenges to growing a more nurturing San Joaquin Valley*. Fresno, CA: Central Valley Health Policy Institute.
34. Coonrod, D. V., Lopopolo, C. M., Bay, R. C, Balcazar, H., Brady, J, et al. (2000). A natural experiment with maternity care: The defunding of prenatal care for undocumented immigrants. In 128th meeting of American Public Health Association, Boston, MD.
35. Hessol, N. A., Vittinghoff, E., & Fuentes-Afflick, E. (2004). Reduced risk of inadequate prenatal care in the era after Medicaid expansions in California. *Medical Care*, 42(5), 416–422.
36. Ku, L., & Blaney, S. (2000). *Health coverage for legal immigrant children: New census data highlight importance of restoring Medicaid and SCHIP coverage*. Washington D.C.: Center on Budget and Policy Priorities.
37. Seils, D. M., Castel, L. D., Curtis, L. H., & Weinfurt, K. P. (2002). Welfare reform and Latinas' use of perinatal health care. *American Journal of Public Health*, 92(5), 699.
38. Spetz, J., Baker, L., Phibbs, C., Pedersen, R., & Tafoya, S. (2000). The effect of passing an "anti-immigrant" ballot proposition on the use of prenatal care by foreign-born mothers in California. *Journal of Immigrant Health*, 2, 203–212.
39. Gortmaker, S. L. (1979). The effects of prenatal care upon the health of the newborn. *American Journal of Public Health*, 69(7), 653–660.
40. Lu, M. C., Tache, V., Alexander, G. R., Kotelchuck, M., & Halfon, N. (2003). Preventing low birth weight: Is prenatal care the answer? *Journal Maternal Fetal Neonatal Medicine*, 13, 362–380.
41. Misra, D. P., & Guyer, B. (1998). Benefits and limitations of prenatal care from counting visits to measuring content. *Journal of the American Medical Association*, 279(20), 1661–1662.
42. Stevens-Simon, C., & Orleans, M. (1999). Low-birthweight prevention programs: The enigma of failure. *Birth*, 26(3), 184–191.
43. Clark, K., Chun-Mei, F., & Burnett, C. (1997). Accuracy of birth certificate data regarding the amount, timing, and adequacy of prenatal care using prenatal clinic medical records as referents. *American Journal of Epidemiology*, 145(1), 68–71.
44. Gutman, V. (2003). Prenatal care: Revisions to SCHIP extended health care to "unborn children". *Journal of Law, Medicine, and Ethics*, 31(1), 155–157.
45. National Latina Institute for Reproductive Health. (2005). Prenatal care access among immigrant Latinas. <http://latinainstitute.org/es/node/106>. Accessed 15 Sept. 2013.
46. National Women's Law Center. (2003). Implementation of "unborn child" SCHIP regulations covers no new women and leads to loss in benefits. www.nwlc.org/pdf/SCHIPRegsUpdateMay03.pdf. Accessed 14 Dec. 2013.
47. Sperow, E. (2004). Redefining child under the state children's health insurance program: Capable of repetition, yet evading results. *Journal of Gender, Social Policy, and the Law*, 12(1), 137–160.
48. Berk, M. L., Schur, C. L., Chavez, L. R., & Frankel, M. (2000). Health care use among undocumented Latino immigrants. *Health Affairs*, 19, 51–64.
49. Kochar, R., Suro, R., & Tafoya, S. (2005). *The new Latino South: The context and consequences of rapid population growth*. Washington, D.C.: Pew Hispanic Center.
50. Reed, W. J., Bublitz, C., Battaglia, C., & Fickenscher, A. (2005). Birth outcomes in Colorado's undocumented immigrant population. *BMC Public Health*, 5, 100.
51. Passel, J. (2005). *Estimates of the size and characteristics of the undocumented population*. Washington, D.C.: Pew Hispanic Center.